INSTRUCTION MANUAL

For

MODEL 1395/1385

TERMINATED THERMAL VOLTAGE CONVERTERS

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GENERAL INFORMATION

1-1. INTRODUCTION

The Ballantine Thermal Voltage Converters (TVC's); see Figure 1-1, convert complex AC input signals to dc voltages, accurately proportional to the rms. value of the input. All models essentially have a flat response from 10 Hz to 10 MHz.

Typical applications of the TVC's include:

a: Calibration of AC and RF voltmeters and multimeters.

b: Frequency response measurements of AC calibrators, signal generators, amplifiers, and detectors.

c: Power measurements of complex waveforms. Converter output voltage is proportional to true input power.

1-2. GENERAL DEFINITIONS

The RF-dc difference is generally defined in the equation:

$$d = \frac{2VRF}{|Vdc^+| + |Vdc^-|} - 1$$

Where VRF, Vdc^+, and Vdc^- are the ratio frequency and direct (positive and negative) voltage required to produce the same output from the converter.

The dc reversal error is generally defined by the equations:

$$\delta = \frac{|Vdc^-|}{|Vdc^+|} - 1$$

1-3. SPECIFICATIONS

1-3.1 Voltage Ranges:

MODEL	Z	Voltage RMS
1395A-0.4	50Ω	0.08-0.54
1395A-1	50Ω	0.2-1.3
1395A-3	50Ω	0.6-3.9
1395A-6	50Ω	1.2-8.1
1395A-1 MOD 75	75Ω	0.2-1.3
1395A-1 MOD 93	93Ω	0.2-1.3
1395A-1 MOD 135	135Ω	0.2-1.3
1395A-1 MOD 150	150Ω	0.2-1.3
1395A-1 MOD 600	600Ω	0.6-3.9

1395A-x-10 Series: Same as 1395A, but supplied with ±0.005% DC reversal error thermoelement.

Caution: Never exceed 5 mA heater current to maintain DC reversal error specification.

1385 Series: Same specifications as 1395A, but with PCB Base Mount.

Peak voltage limited to 150% of full scale rms. at 30% maximum duty factor and represents absolute maximum value for recurrent o non-recurrent input signals with on time <1 mS.

1-3.1.1 Input Resistance:

50Ω ± 0.15Ω; 75Ω ± 0.25Ω; 93Ω ± 1Ω;135Ω ± 2%, 150Ω ± 3%, 600Ω ± 3%, measured at DC and nominally constant to 10 MHz.

1-3.1.2 Calibrated Frequency Range:

DC and 10 Hz to 10 MHz (100 MHz with Option 09, 50 MHz with Option 08).

1-3.1.3 Usable Frequency Range:

DC and 5 Hz too greater than 100 MHz.

1-3.2 Thermocouple Characteristics (at 23°C ± 1°C):

1-3.2.1 Nominal Heater Current: 5mA

1-3.2.2 Maximum safe input voltage: 150% of full scale input voltage rating. Maximum peak voltage is 1.8 times full scale with 30% duty cycle and maximum on time <1 ms.

1-3.2.3 DC Output Voltage: 7mV±20% at nominal heater current

1-3.2.4 DC Output Resistance: 7 to 9.5Ω

1-3.2.5 Maximum AC/DC Reversal Error at full scale: ± 0.04% "A" Series and ±0.005% for option 10.

1-3.2.6 Temperature Coefficient: Nominal 2000 ppm/°C

1-3.2.7 Couple output voltage to heater (ground): normally should not exceed ± 10V, absolute maximum ±50 V peak.

1-3.3 Allowable AC-Dc Difference

Test Frequency (in MHz)	AC-DC Difference (in %)
10	± .1
30	± .5
50	± 1
70	± 3
100	± 3

Table 1-1: Allowable AC-DC Difference

1-3.4 Environmental

Operating Temperature:
4°C to 40°C

Humidity:
0 to 90% RH (no condensation)

Operating Altitude:
To 10,000 feet

Storage Altitude:
To 50,000 feet

1-3.5 Mechanical (1395 Series)

Height:
1-1/4 inches (32mm)

Width:
1-7/8 inches (47 mm)

Length (exclusive of connectors):
3 inches (78 mm)

Weight:
5-1/2 ounces (156 gm)

Input connectors:
Male BNC

Output Connectors:
3 pin Male Receptacle Type MS3102A-10 SL-3P

1-3.6 Mechanical (1385 Series)

Height:
.975 inches

Width:
1.13 inches

Length:
2.25 inches

Weight:
1.6 ounces

Connectors:
PCB mountable pins

1-4. AVAILABLE OPTIONS

1-4.1 For 50Ω Units:

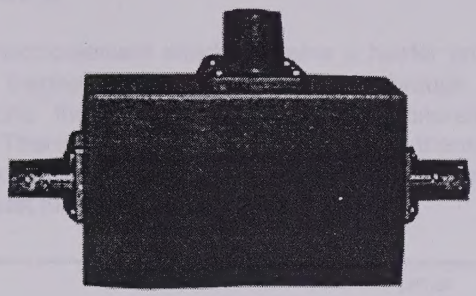
Option 09:
Additional calibration data at 10 MHz, 30 MHz, 50 MHz, 70 MHz, and 100 MHz

Option 10:
±0.005% DC reversal error at full scale.

1-4.2 For Balanced Units:

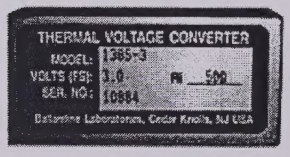
Option 08:
Additional calibration data points at 10 MHz, 30 MHz, and 50 MHz.

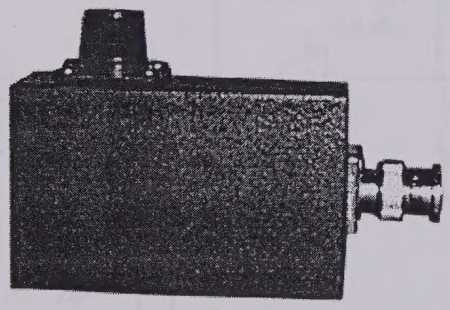
Option 10:
±0.005% DC reversal error at full scale.



1395 Balanced Series TVC's

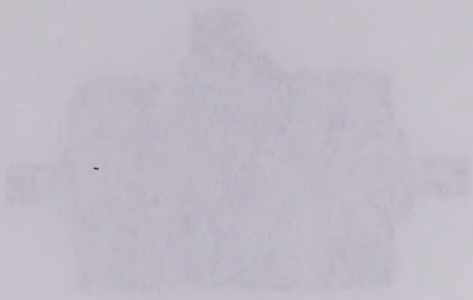
1385 Series TVC's

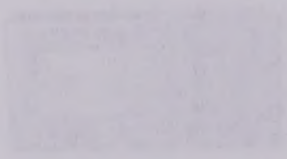




1395 Unbalanced Series TVC's

Figure 1-1

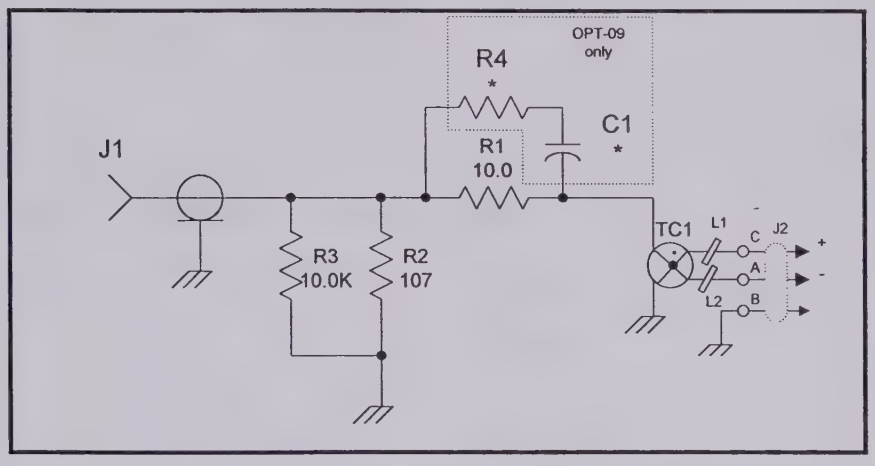




CIRCUIT DESCRIPTION

2-1. GENERAL

A 90Ω UHF thermoelement which contains a heater and a thermoelectric junction, comprise the basic circuit of the thermal converter (Figures 2-1 through 2-7). The AC input current elevates heater temperature and the thermoelectric junction generates a dc voltage proportional to the heater temperature. Therefore, the output voltage of the thermal converter is proportional to the input heating power. Resistor limits the current through the thermoelement to 5 mA with nominal rated voltage. R1, R2, R3 and R5 adjust the input resistance.



Notes:
1. R3 is a factory selected value
2. R4 is a CAL item and C1 and R4 are used only in option 09.

Figure 2-1: Model 1395A-04, Schematic Diagram

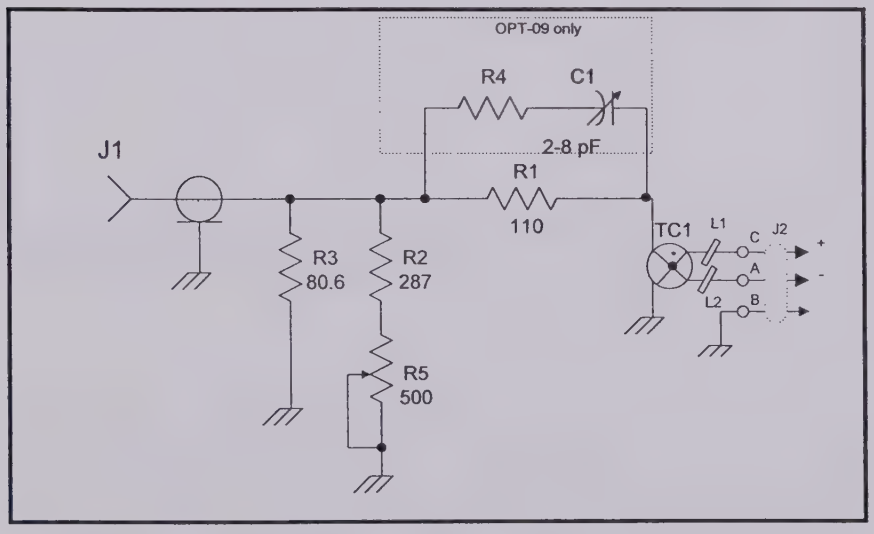


Figure 2-2: Model 1395A-1, Schematic Diagram

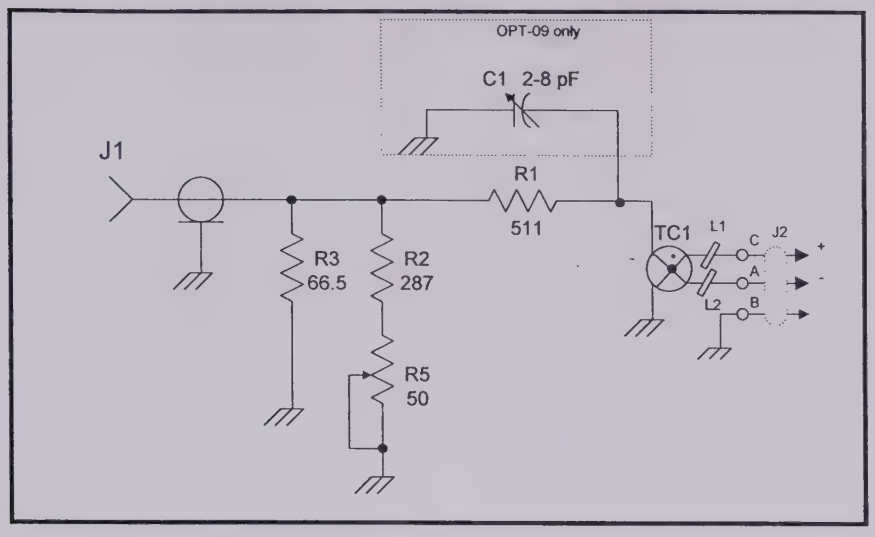


Figure 2-3: Model 1395A-3 Schematic Diagram

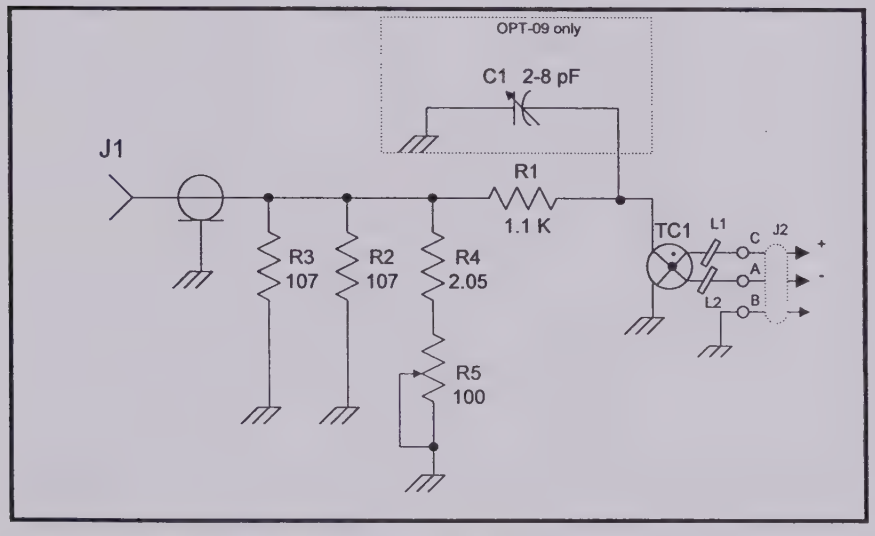


Figure 2-4: Model 1395A-6 Schematic Diagram

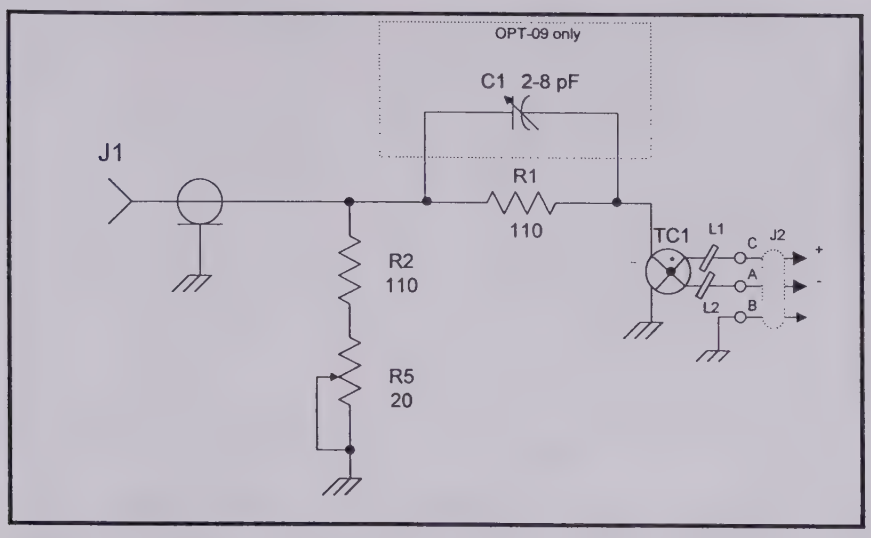


Figure 2-5a. Model 1395A-1M75

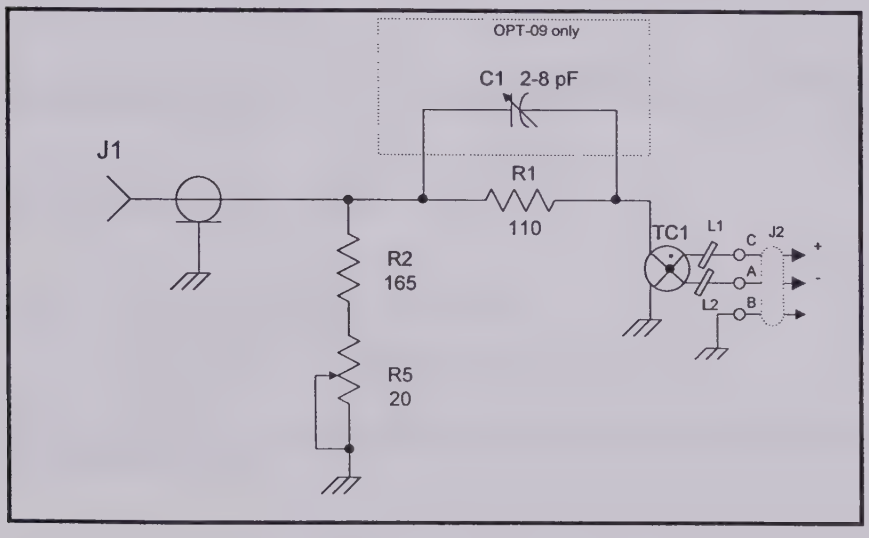


Figure 2-5b. Model 1395A-1M93

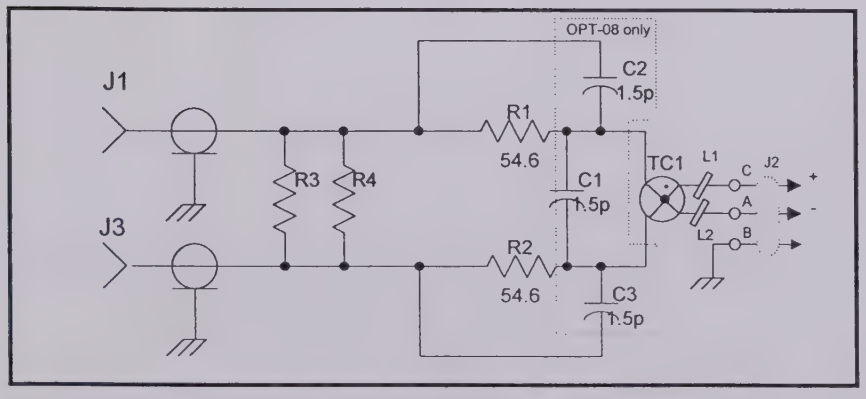


Figure 2-6: Model 1395A-1M135, 1M150 Schematic Diagram

Notes:
1. R3 see Table 2-1 for Values
2. R4 is a Factory selected value

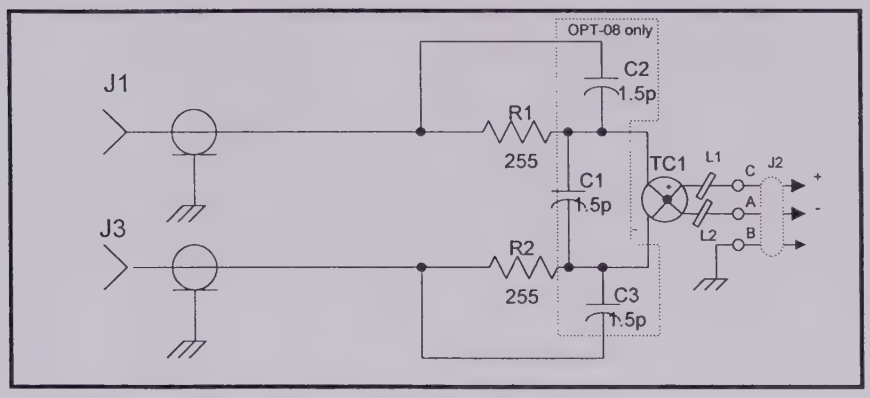


Figure 2-7: Model 1395A-3M600 Schematic Diagram

2-2. INPUT-OUTPUT RELATIONSHIPS

The output voltage of the TVC's is a function of input power. Therefore, the output varies as the square of the input. When the input is doubled, the output will be four times as great. When the input is halved, the output will drop to one fourth.

For input changes of less than 3%, the input-output relationship is essentially linear; and the percent input change is equal to twice the percent input change. The following formula shows the relationship.

$$\% \text{ of change} = \frac{\Delta E_{DC}}{N E_{DC}} x100$$

Where: E_{DC} = thermal converter output voltage
ΔEDC = change of EDC
N = Square law conformity of the TE. Nominally 1.8

If the input level is to be varied by more than 3% the actual input-output characteristic should be measure. This is best done at DC.

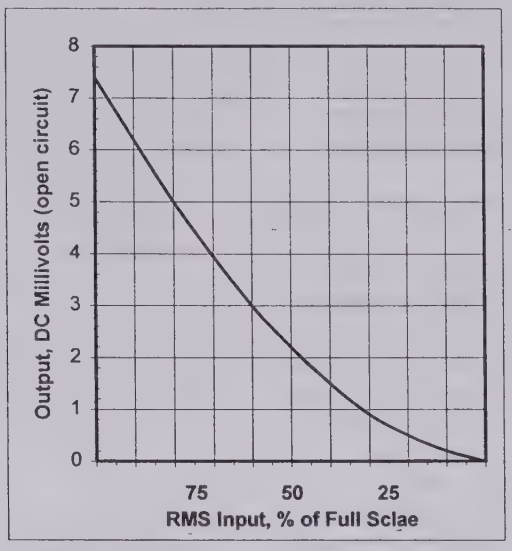


Figure 2-8 Input-Output Relationship

Since the thermal elements in the converter have a small thermal lag, a ten second settling time is recommended for measurements requiring the utmost precision.

Figure 2-8 graphically illustrates the input-output relationship.

2-3. INPUT DYNAMIC RANGE

The dynamic range of Ballantine TVC's are limited by the resolution and noise (at best about 100 nanovolts) of the system used to measure the output voltage of the couple. At full-scale input level the output is approximately 7 mV. The conversion follows a square law relationship and the DC output therefore drops by 100 whenever the input is reduced by a factor of 10. The 1395A Series has a dynamic input voltage range somewhat greater than three to one which permits better than 0.005% resolution when the DC output measuring system has 100 nV or better resolution with noise effects below 20 nanovolts.

Table 2-1. Model 1395A Series Resistor, Values (in Ohms)

Model	R1	R2	R3	R4	R5
1395A-04	10.0Ω	107Ω	10.0Ω	Cal. Item	N/A
1395A-1	110.0Ω	287Ω	80.6Ω	Cal. Item	500Ω
1395A-3	511.0Ω	287Ω	66.5Ω	N/A.	50Ω
1395A-6	1.1Ω	107Ω	107.0Ω	2.05 kΩ	100Ω
1395A-1MOD75	110.0Ω	110Ω	N/A	N/A	20Ω
1395A-1MOD93	110.0Ω	165Ω	N/A	N/A	20Ω
1395A-1M135	54.9Ω	54.9Ω	464Ω	Cal. Item	N/A
1395A-1M150	54.9Ω	54.9Ω	715Ω	Cal. Item	N/A
1395A-3M600	255Ω	255Ω	N/A	N/A	N/A

OPERATION

3-1. PRECAUTIONS

Burnout of the thermoelement heater occurs so rapidly when the maximum peak power is exceeded that the rise in DC couple output voltage cannot be readily detected. Therefore it is necessary to take the following precautions to avoid damaging the thermocouple.

A. Be sure the voltage being measured is reduced to its lowest value before connecting or disconnecting the thermal converter input. Never allow intermittent wiring connections or poorly assembled connectors.

B. Provide a method for limiting, monitoring or controlling the input voltage being measured by the thermal converter.

C. Do not change the frequency of the generator providing the voltage to be measured without first reducing the voltage of the generator to its lowest value. Caution: Most signal generators and oscillators produce large transient voltages when changing range.

D. Monitor heater input by observing TE DC output voltage. Do not allow the open-circuit DC couple voltage to exceed 12 mV (equivalent to 6.5 mA of heater current).

E. Non-sinusoidal waveforms, such as transients and pulse trains must have peak voltages that crest within the peak voltage and duty factor specifications.

F. Use precision attenuators with matching impedance to the 1395A in use. Place them ahead of the TVC's when larger voltages or unknown signals are to be measured.

G. When input voltages larger than 6 V rms. are to be measured or when high impedance TVC inputs are required, use:

1. The Ballantine 1605 (ATS) Auto-Balance Transfer Standard.

2. The Ballantine Coaxial Thermal Converter Series 1394, 200 ohms/volt DC to 100 MHz.

H. Never exceed the breakdown voltage rating of ±50 volts peak between couple and heater during set up of instrumentation. Provide a zener limiter or resistor from the thermocouple to a ground return path to avoid exceeding the breakdown rating.

3-2. DC OUTPUT MEASUREMENTS

A stable 6.5 digit nanovoltmeter such as the Keithley 181 may be used. It will read the changes in DC output amplitude from the 1395. The Keithley 181 includes a ZERO set mode that can approximate a deviation from null measurement.

While making all thermal converter measurements, a constant ambient temperature should be maintained. The range of 23°C±3°C is recommended. The thermal converter responds to changes in ambient temperature (with a temperature coefficient of approximately 2000 ppm/°C) as well as responding to the heating power of the input signal. Air flow around thermal converter should be avoided.

3-3. FREQUENCY RESPONSE MEASUREMENTS

A Test setup for making accurate frequency response measurements is shown in Figure 3-1. The following steps describe the measurements.

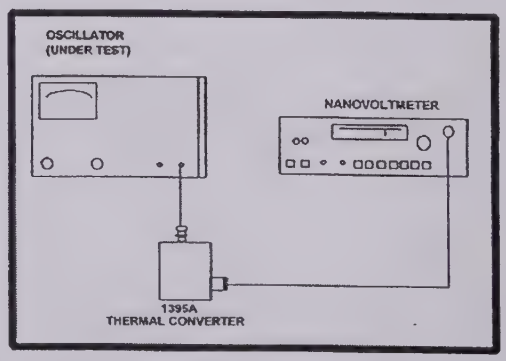


Figure 3-1. Frequency Response Measurements Test Setup

a. Set the oscillator output levels to minimum.

b. Connect the test equipment as shown in Figure3-1 keeping the connecting cable between

the oscillator and thermal converter as short as possible. Use shielded low noise cables and ground the reference voltage supply to the chassis ground of the nanovoltmeter.

c. Adjust oscillator amplitude for an indication of about 7 mV on the null meter.

CAUTION

Do not exceed the rated input of the thermal converter. Always reduce the input before changing frequency range of circuit under test. Any overload or high voltage transient may destroy the thermoelement. Ground test equipment and do not exceed couple to heater voltage rating.

d. Select zero on the nanovoltmeter or record rf reading. Do not readjust the oscillator level.

CAUTION

Frequency or range changes on same oscillators may cause overload voltage transient.

e. Change the input frequency and observe thermal converter output changes. Remember that the percent of converter output change read on the nanovoltmeter equals approximately twice the percentage input signal level change. (See Par. 2.2)

3-4. GENERATING AN ACCURATE CALIBRATION SIGNAL

The test setup shown in Figure 3-2 provides a test signal that may be used for both frequency response and absolute value calibration at any frequency within the TVC range. The DC standard provides the absolute value voltage reference, and the test oscillator generates the AC calibration signal. When S1 is set to the DC position and output of the DC Voltage Standard is set to the desired calibration voltage, the reference supply is adjusted for a null indication on the null meter. When S1 is switched to the AC position, the oscillator output amplitude is adjusted to re-establish a null indication. This sets the rms. value of the oscillator output equal to the DC voltage standard output. The oscillator output signal is used for the instrument under test.

3-5. DC REVERSAL ERROR

DC inputs of opposite polarity will produce slightly different outputs from the thermal converter. See General Definitions 1-4. Sinusoidal input signals have equal energy content in positive and negative half cycles. These sinewave signals automatically average DC reversal errors in the thermocouple. Nevertheless, unidirectional signals such as pulse trains, switching transients, and sinewaves with DC offset will primarily have energy content in one polarity and therefore, thermal converters require DC reversal error correction. The DC reversal error is less than 0.04% (0.005% for H Series) and does not

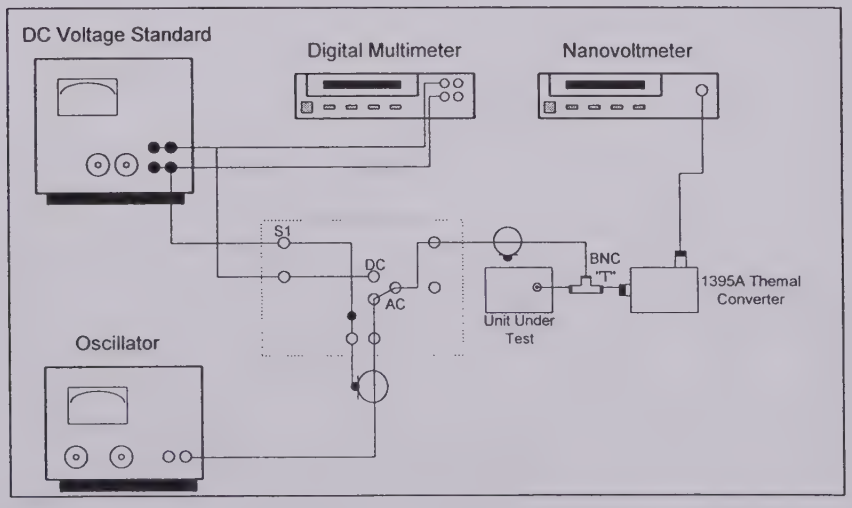


Figure 3-2: Generation of a Precise Test Signal Test Setup

affect most measurements, but it should be considered to achieve maximum accuracy. For best DC reversal error performance specify 1395-x-10 Series.

Instructions for correcting precise measurements for DC reversal error are given in the following calibration procedure in Part 4.

CALIBRATION

4-1. GENERAL

The steps that follow describe a "covers on" user procedure for generating a one volt calibration signal within the TVC specifications. One volt is applicable to 1395A-1. 1395A-0.4, 1395A-3, and 1395A-6 use 0.4 volt, 3 volts, and 6 volts respectively. Steps c through h describe the procedure for compensating DC reversal error.

NOTE:

A TVC is a true rms. converter responsive to the true heating value of the input signal. Average responding circuits react differently to harmonic and waveshape distortion.

Calibration is normally performed with pure sinusoidal waveforms and any noise, waveshape error or harmonic distortion present will create a calibration error between the thermal converter and the instrument under test. Note that the TVC always measures the entire energy content (heating value) of the input calibration signal including harmonics, noise energy, and non-harmonically related distortion. Use of a low distortion test oscillator is required to avoid possible calibration error of the instrument to be checked.

CAUTION

Never exceed the couple to heater breakdown voltage rating.

a. Set the test oscillator and DC voltage standard output level to minimum.

b. Connect the test equipment and instrument under test as shown in Figure 3-2. Keep all connecting cables and adapters as short as possible. Perform these tests in a low electrical noise or shielded environment. Always ground test equipment.

c. Set S1 (in Figure 3-2) to DC, and the DC voltage standard output to +1.00000V±0.001%.

d. Record the nanovoltmeter indication. Do not readjust DC reference supply output.

e. Reverse the polarity of the DC voltage standard output and again record the nanovoltmeter reading.

f. Add the nanovoltmeter reading of step d and e.

g. Divide the sum in step f by two. This averages the DC reversal error of TVC.

h. Set S1 to AC and the oscillator frequency to one kHz. Set the oscillator output so that the nanovoltmeter indications equals the average reading determined in step g. This sets the oscillator output to 1-volt rms.

i. Record the reading and error of the instrument under test. This instrument will usually be a passive device such as an AC voltmeter, wave analyzer, spectrum analyzer, etc.

CAUTION

Do not change the oscillator frequency range without first lowering oscillator output. Switching transients may destroy the thermoelement.

j. Adjust the frequency to the desired test frequency. Then readjust the oscillator output amplitude for the same nanovoltmeter indication obtained in step h. Record the reading and error of the instrument under test. If desired, apply the AC-DC difference (correction) of your 1395A at each frequency where a 1 volt (or 0.4, 3, or 6 volt) signal is generated.

k. Repeat steps j and I for each test frequency desired.

4-2. AC DIFFERENCE CALIBRATION @ 1 KHZ

The AC-DC difference of 1395 thermal converters at 1 kHz is negligible compared to the specifications. Therefore the AC-DC difference calibration at higher frequency can be simplified as AC- 1kHz difference calibration.

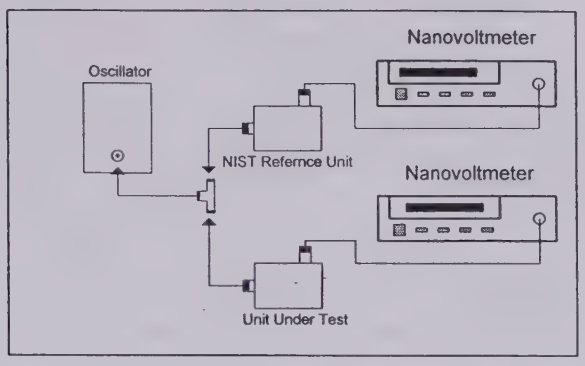


Figure 4-1: Thermal Converter Calibration Test Set-up

The test setup for calibrating AC-1kHZ difference of a TVC to an NIST calibrated reference TVC is shown in Figure 4-1. With this setup, the TVC can be calibrated to within ±0.05% of the reference up to 10 mHz. The steps that follow describe the calibration procedure.

a. Set the test oscillator DC reference supply outputs to minimum.

b. Connect the test equipment as shown in Figure 4-1. Keep connecting adapters to thermal converters as short as possible. Operate in a low noise or shielded environment. Consider the use of battery operated instrumentation to avoid ground loop error and power line disturbances.

c. Adjust the amplitude of the oscillator for an indication of approximately 7 mV on both null meters. Set the oscillator frequency for 1 kHz.

d. Record the indication on the respective nanovoltmeters.

e. Change the oscillator frequency, e.g. 10MHz.

f. Readjust the oscillator amplitude for a null indication on the nanovoltmeter connected to the NIST reference TVC. The nanovoltmeter connected to the TVC under test should indicate the same as the reference nanovoltmeter. If not, record the error and remember that the percent change in the TVC output is equal to twice the percent change in the input (i.e. 1% change in DC outputs equals ½% in input signal change).

g. Use the error data collected in step e and f to make AC-DC corrections whenever using the TVC. If the difference between the reference thermal converter and the TVC under test is greater than the allowable specified in Table 1-1, the TVC is not operating properly. Refer to repair instructions in paragraph 5-1.

h. The calibration of the TVC should be checked against an NIST traceable reference TVC at least once a year.

4-3. RECOMMENDED TEST EQUIPMENT

Shown in Table 4-1

QTY.	ITEM	RECOMMENDED
2	DC Null Meter/DC Micro Voltmeter 10μV to 100 V	Keithley 181,182 Nanovoltmeter
1	AC Voltage Standard	Datron 4200, 4708
1	Precision Digital Voltmeter 100 μV resolution on 1 volt scale. Accuracy ±0.005%	Keithley 181, 182
1	Oscillator 10 Hz to 10 MHz	HP 651B, 652 HP33120A, HP8111A
1	DC Power Supply, 0 to 10 V, 0 to 1A	Power Designs 1515B Datron 4708
1	Impedance Bridge	General Radio Type 1608A
1	50 Ω Feed Thru Termination	Ballantine 12630A
1	AC Voltmeter, 1 mV full scale, 10 Hz to 10 MHz	Ballantine 3045A
1	BNC Tee Connector UG 274/C	Ballantine 12619A
1	NIST traceable TVC	Ballantine 1395A-0.4
1	NIST traceable TVC	Ballantine 1395A-1
1	NIST traceable TVC	Ballantine 1395A-3
1	NIST traceable TVC	Ballantine 1395A-6

Table 4-1 Recommended Test Equipment

REPAIR AND MAINTENANCE

5-1. INTRODUCTION

The 1395 series of terminated TVC are precision wideband instruments. The 50 Ω input resistance units are manufactured with selected components and, with adjustable trim potentiometers and trim capacitors. The following procedure describes component selection and component adjustment for calibrating and maintaining the 1395 series of terminated TVC.

5-2. REPAIRING THE THERMAL ELEMENT

If the TVC is out of AC-DC difference calibration below 10 MHz or it has no DC output, then the UHF thermoelement should be replaced. Since the values of input resistor R3, and resistors R4 and R5 in the circuit (see Figures 2-1 through 2-7) depend on variations in thermoelement characteristics, they must always be reselected when the thermoelement is replaced.

5-3. SETTING INPUT RESISTANCE

The input resistance of the 1395 is used as a precise terminating resistance for the system under test. The 1395 input resistance is factory set at 50, 75,93, 135, 159, or 600 ohms.

5-4. ADJUSTING 50 Ω INPUT RESISTANCE (1, 3, AND 6 VOLT UNITS)

Attach a digital ohmmeter to the input connector of 1395. Adjust R5 (as shown in Figures 2-2, 2-3, and 2-4) to achieve a reading of 50 Ω(±0.15 Ω).

5-5. OPTIONAL PROCEDURE FOR AC CALIBRATION OF INPUT IMPEDANCE OF THERMAL CONVERTER AT 10 KHZ.

a. Connect equipment as illustrated in Figure 5-2.

CAUTION
Do not connect thermal converter to be calibrated until after step d is completed.

b. Set impedance bridge (General Radio 1608A) to resistive impedance.
c. Adjust test oscillator for output frequency of 10 kHz.
d. Set rms. output amplitude of the test oscillator for appropriate input for thermal converter to be tested (i.e. 1395A-0.4 – 0.45V; 1395A-1 – 1.0V; 1395A-3 – 3.0V; 1395A-6 – 3V or 6V if high power low distortion oscillator is used) as indicated on AC voltmeter, Ballantine Model 3045 or 323, with a 50 Ω feed through termination in series with voltmeter input.
e. Disconnect AC voltmeter and connect thermal converter to be tested to UNKNOWN terminals on the impedance bridge.

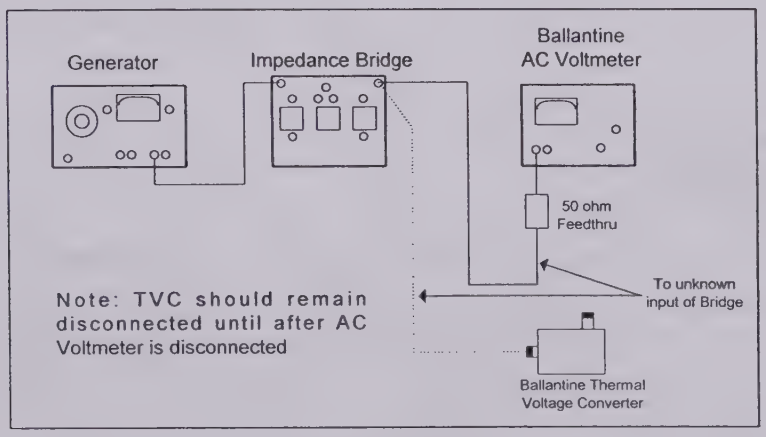


Figure 5-2: AC Calibration of Input Impedance

5-6. FREQUENCY FLATNESS COMPENSATION C1

Most 1395 units and all 1395 Option 09 units require capacitive compensation of the thermal element to provide best compensation at 10 MHz (50 MHz for Option 08 and 100 MHz for Option 09). See Figures 2-2 through 2-4 for schematics showing this compensation. In some units the capacitor is placed across the series resistors and in others it is connected across the thermal element. To assure best high to midband flatness, a resistor may be selected in series with the adjustment capacitor to peak up midband response.

Connect the test setup of Figure 4-1. Connect the 1395 UUT and the 1395 reference of the same voltage rating directly to a BNC tee as shown in Figure 4-1.

a. Apply 1 kHz at 1395 full scale rms amplitude.
b. Null the two nanovoltmeters.
c. Increase the input frequency to 10 MHz (or 100 MHz with Option 09).
d. Adjust the oscillator amplitude to maintain the null output of step b.
e. Adjust C1, the capacitive trimmer, or select C1 until the 1395 UUT null meter nulls ±100 μV as in step b.
f. After adjustment, close the 1395 UUT cover and check at 10 MHz (and 30 MHz, 50 MHz, 70 MHz, and 100 MHz for Option 09) using the procedure of paragraph 4-2. Record all AC-DC differences of the UUT and correct by adding the AC-DC correction of the reference 1395 at each frequency. Be certain to observe polarity of the AC-DC correction factors. Compute the above and record as the AC-DC correction factors (frequency) flatness of the 1395 UUT.

5-7. INSTALLATION OF THERMOELEMENT AND RESISTORS

The spatial orientation of the components within the thermal converter is critical. Placing the components improperly may cause serious degradation of the higher frequency response.

Field replacement of the thermocouple used in the Model 1395A is possible provided that the leads are cut and shaped to conform exactly to the unit just removed.

CAUTION

Utilize an adequate heat sink when making soldering connections to the thermoelement. Excessive or extended heating will change thermoelement characteristics. Use a grounded soldering iron with a three wire power cord to avoid exceeding the couple to heater breakdown voltage rating.

a. Keep all leads as short as possible.
b. Ensure proper component mounting.
c. Avoid bending thermoelement leads any more than is absolutely necessary as excessive bending may weaken glass seal and reduce isolation.
d. Red (positive) lead should be connected to thermoelement output lead marked with a red dot.

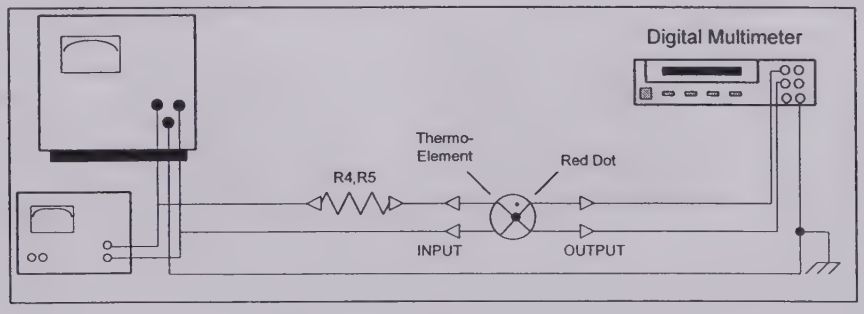


Figure 5-2: Resistor Selection
(Selection of R4 or R5 or a single equivalent resistor in series with the heater of the TVC.)

REPLACEMENT PARTS LISTING

6-1. PARTS LIST FOR UN-BALANCED, 50 OHM 1395 TVC'S

PARTS LIST 1395A-0.4 1395A W/50OHMS 0.08-0.54(TO 10

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13111-0	RFF 10.0 500.0MW F	016299	CGW NA60
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-0.4-09 THERMAL VOLT.CONV 0.4V-OPT09

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-10553-0	CMD 110.0PF 300.0 VJ	050423	ARCO CM04FD111J03 OIE
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13111-0	RFF 10.0 500.0MW F	016299	CGW NA60
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
R...4	12-09839-0	RFC 5.1 250.0MW J+- 5%	075042	IRC TYP
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-0.4-09-10 THERMAL CONVERTOR

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-10553-0	CMD 110.0PF 300.0 VJ	050423	ARCO CM04FD111J03 OIE
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13111-0	RFF 10.0 500.0MW F	016299	CGW NA60
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
R...4	12-09839-0	RFC 5.1 250.0MW J+- 5%	075042	IRC TYP
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-0.4-10 THERMAL CONVERTOR

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13111-0	RFF 10.0 500.0MW F	016299	CGW NA60
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-1 1395A W/50OHMS 0.2-1.3(TO 10 M

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13189-0	RFF 110.0 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...5	09-10001-0	RVC 500.0 0.5 W K	073138	HEL TYP 72PMR
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-1-09 THERMAL VOLT.CONV 1V-OPT.09

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02442-0	CVC 2.0-8PF 200 V	072982	ERIE DV11P8A
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13189-0	RFF 110.0 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...5	09-10001-0	RVC 500.0 0.5 W K	073138	HEL TYP 72PMR
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-1-09-10 THERMAL VOLT.CONV 1V-OPT.09

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02442-0	CVC 2.0-8PF 200 V	072982	ERIE DV11P8A
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13189-0	RFF 110.0 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...5	09-10001-0	RVC 500.0 0.5 W K	073138	HEL TYP 72PMR
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-1-10 THERMAL VOLT.CONV 1V

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13189-0	RFF 110.0500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...5	09-10001-0	RVC 500.0 0.5 W K	073138	HEL TYP 72PMR
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-3 1395A W/50OHMS 0.6-3.9(TO 10 M

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13191-0	RFF 511.0 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-13190-0	RFF 66.5 500.0MW F	080031	MEPCO RN60D 0/E
R...5	09-10095-0	RVF 50.0 500.0MW M	073138	HELIPOT 72PMR0
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-3-09 THERMAL CONVERTER

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02442-0	CVC 2.0-8PF 200 V	072982	ERIE DV11P8A
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13191-0	RFF 511.0 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-13190-0	RFF 66.5 500.0MW F	080031	MEPCO RN60D 0/E
R...5	09-10095-0	RVF 50.0 500.0MW M	073138	HELIPOT 72PMR0
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-3-09-10 THERMAL VOLT.CONV 3V-OPT.09

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02442-0	CVC 2.0-8PF 200 V	072982	ERIE DV11P8A
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13191-0	RFF 511.0 500.0MW F	080031	MEPCO RN60D 0/E

R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-13190-0	RFF 66.5 500.0MW F	080031	MEPCO RN60D 0/E
R...5	09-10095-0	RVF 50.0 500.0MW M	073138	HELIPOT 72PMR0
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-3-10 THERMAL VOLT.CONV 3V

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13191-0	RFF 511.0 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R...3	12-13190-0	RFF 66.5 500.0MW F	080031	MEPCO RN60D 0/E
R...5	09-10095-0	RVF 50.0 500.0MW M	073138	HELIPOT 72PMR0
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-6 1395A W/50OHMS 1.2-8.1(TO 10 M

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13193-0	RFF 1.10K 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...4	12-12316-0	RFF 1.47K 250 MW F+- 1%	016299	CGW RN55D 1471 F
R...5	09-10151-0	RVF 2.0 K 500.0MW	073138	HELIPOT 72PMR2K
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-6-09 THERMAL VOLT.CONV 6V-OPT.09

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02442-0	CVC 2.0-8PF 200 V	072982	ERIE DV11P8A
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13193-0	RFF 1.10K 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...4	12-12316-0	RFF 1.47K 250 MW F+- 1%	016299	CGW RN55D 1471 F
R...5	09-10151-0	RVF 2.0 K 500.0MW	073138	HELIPOT 72PMR2K
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-6-09-10 THERMAL VOLT.CONV 6V-OPT.09

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C..1	07-02442-0	CVC 2.0-8PF 200 V	072982	ERIE DV11P8A
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13193-0	RFF 1.10K 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...4	12-12316-0	RFF 1.47K 250 MW F+- 1%	016299	CGW RN55D 1471 F
R...5	09-10151-0	RVF 2.0 K 500.0MW	073138	HELIPOT 72PMR2K
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-6-10 THERMAL VOLT.CONV 6V

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-13193-0	RFF 1.10K 500.0MW F	080031	MEPCO RN60D 0/E
R...2	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...3	12-13194-0	RFF 107.0 500.0MW F	080031	MEPCO RN60D 0/E
R...4	12-12316-0	RFF 1.47K 250 MW F+- 1%	016299	CGW RN55D 1471 F
R...5	09-10151-0	RVF 2.0 K 500.0MW	073138	HELIPOT 72PMR2K
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 89-11699-1 ASY 1395A UN-BAL COMMON

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
J1	31-10227-0	CON BNC MALE FLNGE	091836	KINGS UG1104 A/U
J2	31-10001-0	CON 3 PIN MALE REC	029587	AMPH MS-3102A-10SL-3P

6-2. PARTS LIST FOR BALANCED 1395 TVC'S

PARTS LIST 1395A-1M135 1395A WITH 135 OHMS

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R..1	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12264-0	RFF 464.0 250MW F+- 1%	016299	CGW RN55D 4640 F
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-1M135-08 THERMAL VOLT.CONV 1V-OPT.08

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...2	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...3	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...4	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
R..1	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12264-0	RFF 464.0 250 MW F+- 1%	016299	CGW RN55D 4640 F
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-1M135-08-10 THERMAL VOLT.CONV 1V-OPT.08

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02544-0	CCT 1.5PF 500V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...2	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...3	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...4	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
R..1	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12264-0	RFF 464.0 250 MW F+- 1%	016299	CGW RN55D 4640 F
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-1M135-10 THERMAL VOLT.CONV 1V

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...2	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...3	12-13188-0	RFF 294.0 500.0MW F	080031	MEPCO RN60D 0/E
R...4	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-1M150 1395A WITH 150 OHMS

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L....1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L....2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R..1	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12282-0	RFF 715.0 250.0MW F+- 1%	016299	CGW RN55D 7150 F
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-1M150-08 THERMAL VOLT.CONV 1V-OPT.08

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...2	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...3	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R..1	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12282-0	RFF 715.0 250.0MW F+- 1%	016299	CGW RN55D 7150 F
R..4	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-1M150-08-10 THERMAL VOLT.CONV 1V-OPT.08

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C...1	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...2	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C...3	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
L...1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L...2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R...1	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R...2	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R..3	12-12282-0	RFF 715.0 250.0MW F+- 1%	016299	CGW RN55D 7150 F
R..4	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-1M150-10 THERMAL VOLT.CONV 1V

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L....1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L....2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R....4	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
R..1	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-13192-0	RFF 54.9 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12282-0	RFF 715.0 250.0MW F+- 1%	016299	CGW RN55D 7150 F
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-3M600 1395A WITH 600 OHMS

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L....1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L....2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R....1	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
R....2	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-3M600-08 THERMAL VOLT.CONV 3V-OPT.08

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C....1	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C....2	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C....3	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
L....1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L....2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R....1	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
R....2	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1395A-3M600-08-10 THERMAL VOLT.CONV 3V-OPT.08

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C....1	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C....2	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
C....3	07-02544-0	CCT 1.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TP QC
L....1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L....2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R....1	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
R....2	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 1395A-3M600-10 THERMAL VOLT.CONV 3V

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
L....1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L....2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R....1	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
R....2	12-13187-0	RFF 255.0 500.0MW F	080031	MEPCO RN60D 0/E
TC1	27-10000-1	THC 5 MA .005% MODIFIED	050423	BLI

PARTS LIST 89-11700-1 ASY 1395A BAL COMMON

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
J1	31-10001-0	CON 3 PIN MALE REC	029587	AMPH MS-3102A-10SL-3P
J2	31-10228-0	CON BNC FEM	091836	KC 79-291M06
J3	31-10228-0	CON BNC FEM	091836	KC 79-291M06

PARTS LIST 1395A-0.4M75-98 TVC 1395A-0.4MOD75-OPT98

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C..1	07-10553-0	CMD 110.0PF 300.0 VJ	050423	ARCO CM04FD111J03 OIE
L..1	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
L..2	46-10000-0	FRB FERRITE BEAD	078488	STACKPOLE 57-0180-7D MAT
R..1	12-13111-0	RFF 10.0 500.0MW F	016299	CGW NA60
R..2	12-12721-0	RFF 301.0 500.0MW F+- 1%	016299	CORNING NA65
R..3	12-12400-0	RFF 10.0 K 250.0MW F+- 1%	016299	CGW RN55D 1002 F
R..4	12-12820-0	RFC 5.1 125.0MW J+- 5%	001121	A-B TYPE BB OR EQUIV
TC1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI
J1	31-10227-0	CON BNC MALE FLNGE	091836	KINGS UG1104 A/U
J2+	74-10032-0	TRM FEED THRU TEFLON	098291	SEALECTRO MODEL 011-2053
J2-	74-10032-0	TRM FEED THRU TEFLON	098291	SEALECTRO MODEL 011-2053

6-3. PARTS LIST 1385 SERIES TVC'S

Parts List 1385-1 TVC 1V PC MOUNT TVC

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
C..1	07-02514-0	CCT 7.5PF 500 V J+- 5%	095121	QUALITY COMPONENTS TYP QC
R..2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R..1	12-13189-0	RFF 110.0 500.0MW F	080031	MEPCO RN60D 0/E
R..3	12-12971-0	RFF 80.6 500.0MWF 50PPM	016299	CGW RN60C 50PPM
R..5	09-10001-0	RVC 500.0 0.5 W K	073138	HEL TYP 72PMR
TC.1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

PARTS LIST 1385-3 TVC 3V PC MOUNT TVC

SCHEMATIC REF.	BALLANTINE PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NUMBER
R..1	12-13191-0	RFF 511.0 500.0MW F	080031	MEPCO RN60D 0/E
R..2	12-12244-0	RFF 287.0 250 MW F+- 1%	016299	CGW RN55D 2870 F
R..3	12-13190-0	RFF 66.5 500.0MW F	080031	MEPCO RN60D 0/E
R..5	09-10095-0	RVF 50.0 500.0MW M	073138	HELIPOT 72PMR0
TC.1	27-07946-1	THC 5MA 0.04% REV. MODIFIED	050423	BLI

MP MASTER
MA31957